UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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August 13, 2013

Mr. Eric Summa, Chief
Environmental Branch,
Planning Division,
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

SUBJECT: Port Everglades Harbor Navigation Improvements Draft Environmental Impact Study and Feasibility Study, CEQ No. 20130178, ERP No. COE-E32085-FL

Dear Mr. Summa:

To fulfill EPA's Clean Air Act (CAA) § 309 and National Environmental Policy Act (NEPA) § 102(2)(C) responsibilities, EPA reviewed the above draft SEIS. Under § 309, EPA is directed to review and comment publicly on the environmental impacts of Federal activities.

EPA's primary concerns involve potentially significant impacts to public water supplies, water quality, aquatic ecosystems including corals and hardbottoms, mangrove wetlands, seagrasses, associated mitigation. Our detailed technical comments are enclosed to assist with the preparation of the final SEIS. EPA is willing to work with USACE to address our significant concerns. Based on our review, we have rated this draft EIS as "Environmental Concerns" (EC-2) rating (EPA's rating criteria can be found at (http://www.epa.gov/compliance/nepa/comments/ratings.html)

Thank you for the opportunity to review this draft SEIS. If you wish to discuss this matter further, please contact Beth Walls, 404-562-8309 or walls.beth@epa.gov, of my staff.

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Environmental Accountability

Enclosures: EPA's Technical Comments

EPA Technical Comments on Draft EIS and Feasibility Study for Port Everglades Harbor Navigation Improvements, Broward County, FL, CEQ No. 20130178

Background

Port Everglades Harbor is located within the cities of Hollywood, Dania Beach, and Fort Lauderdale. Its entrance is approximately 27 nautical miles north of Miami Harbor and 301 nautical miles south of Jacksonville Harbor, Florida.[1]

Port Everglades originally started as a petroleum port[2] and is one of three Florida ports receiving petroleum.[3] It is the main entry and delivery center for petroleum, gasoline and jet fuel for 12 South Florida counties. Nearly one-fifth of Florida's energy requirements and one-fifth of Port Everglades' total revenues comes from petroleum and its byproducts stored and distributed through the Port.[4]

Port Everglades is nationally ranked number 35 for tonnage passing through the port. The Port documented 4,079 vessel calls in 2010.[5] Port tenants include more than 30 shipping lines calling on over 150 ports in 70 countries.[6] Additionally, Port Everglades has a growing cruise ship/passenger vessel presence being a major homeport/destination port for major cruise ship lines. It is one of the world's busiest cruise ports in terms of the number of passengers served. Total annual cruise calls are projected to remain around 2,000 annually.[7]

The Port has access to rail, air, and road transport and land available for storage. It is comprised of three main berthing areas: 1) Northport, which services cruise ships, vessels, tankers, barges, and cargo, 2) Midport, which services cruise ships and cargo, and 3) Southport, which services predominantly container ships with the largest area for growth.[8]

To the east of the Port is a barrier island where a U.S. Navy facility, the Nova Southeastern University Oceanographic Center, a U.S. Coast Guard facility, and the John U. Lloyd Beach State Park and its adjacent beaches are located. South of the Dania Cutoff Canal is the West Lake Park area, the proposed mangrove wetland and seagrass mitigation bank. West of the Port is US Highway 1 flanked by the Fort Lauderdale/Hollywood International Airport. North of the Port is a mixture of small craft waterways and commercial and residential development.[9] The federal Intercoastal Water Way transits through the Port in a north – south direction and serves both barges and recreational vessels.[10] On the ocean side of the barrier island is sandy beach and an offshore reef system.[11]

Purpose & Need: The primary objectives are, through the year 2060, to decrease costs associated with vessel delays from congestion, channel passing restrictions, and berth deficiencies; decrease transportation costs by increasing economies of scale for cargo and petroleum; and increase channel safety and maneuverability for existing and potentially future larger vessels while complying with USACE environmental operating principles.

Alternatives: The proposed action is comprised of the following components: outer and inner entrance channel, three existing turning basins, creating a fourth turning basin, creating a widener, south access channel, and turning notch.[12] USACE looked at a number of depth and

widening alternatives for the outer and inner entrance channel, a number of depth alternatives for the remaining features, and some widening options.

The Tentatively Selected Plan requires the removal of approximately 5.47 million yd^3 of dredged material necessitating the expansion of the existing Port Everglades Offshore Dredged Material Disposal Site,[13] which is being addressed in a separate NEPA action pursuant to the Marine Protection, Research and Sanctuaries Act.[14] The Plan will deepen the outer entrance channel from 45 to 57 feet, extend it 2,200 feet into the ocean, and widen it to 800 feet.[15] Both the inner entrance channel and the main turning basin will be deepened from 42 to 50 feet.[16] The widener, an area of shallow water, will be deepened to 50 and widened to 300 feet.[17] Modifications to the south access channel include widening the "knuckle" area by 250 feet causing the relocation of the US Coast Guard facility, shifting the channel 65 feet to the east to effect a transition from the "knuckle" south to the federal channel, deepening from 42 to 50 feet, and widening a 1,845 foot section by 100 feet and widening by130 feet a section north of the turning notch.[18] The turning notch is to be deepened from 42 feet to 50 feet after the federal sponsor has widened the turning notch by removing 8.6 acres of mangrove wetlands and deepened it to 42 feet.

***Affected Environment*:**

The entrance to the harbor is in the vicinity of three reef tracts: inner (located approximately 100 to 2,000 feet from shore and cresting at 26 feet), middle (located approximately 3,000 to 6,000 feet from shore and in 49 feet of water), and outer (located approximately 8,000 feet from shore and cresting at 52 feet) where all the coral and hardbottom and impacts will occur. These are high-latitude reefs, existing near the northern limit of reef growth in the continental United States.[19] While no longer a growing system, the reef complex provides storm protection, hardbottom habitat for invertebrates and fish species, and recreational uses resulting in economic benefits to South Florida.[20]

The harbor is habitat for seagrasses and mangrove wetlands serving as an estuary for a number of animal and fish species including those protected under the Endangered Species Act. The 287-acre John U. Lloyd State Park is located directly across and parallel to the southport access channel.[21] The State Park's harbor portion includes estuarine tidal swamp (mangroves), estuarine and marine unconsolidated substrates, marine consolidated substrates, and a rare, tropical coastal hammock ecosystem (maritime hammock).[22] These maritime hammocks have become increasingly valuable for their ability to act as "refugia" because of South Florida's near total loss of this plant-community type.[23]

The Florida Department of Environmental Protection designated the waters within the Port as Class III, acceptable for recreation, fish, and wildlife and the waters adjacent to State Park, the Atlantic Ocean, as Outstanding Waters of the State.[24]

***Environmental Impacts*:**

Corals/hardbottom: The most significant impact associated with dredging the outer entrance channel is the permanent removal of coral and hardbottom habitat. The draft EIS indicates the permanent removal of approximately 5.58 acres of the middle reef and approximately 11.09 acres of the outer reef to create the entrance channel flare for vessel safety purposes to address variable and unpredictable cross currents resulting from eddies spinning off the Gulf Stream.[25] It also indicates the potential for another 17.13 acres of reef and nearshore hardbottom could be

impacted associated anchoring the cutterhead dredge equipment. EPA notes these estimates do not include direct impacts to the remaining coral associated with the actual construction activity, e.g., cutterhead dredge and confined blasting effects. EPA also notes a discrepancy in defined impacts exists between the USACE and the National Marine Fisheries Service.

Seagrasses: The draft EIS indicates dredging will permanently remove up to 3.57 acres of mixed or monoculture Johnson's seagrass where it occurs along the south access channel and widener and impede post-dredging recolonization as the seagrasses require shallow, 13-14 foot habitats.[26] Again, EPA notes a discrepancy in defined impacts exists between the USACE and the National Marine Fisheries Service.

Mangrove wetlands: The draft EIS indicates the proposed action will only impact 1.6 acres of jurisdictional mangrove wetlands located along the east side of the south access channel along J. Lloyd State Park's western shore.[27] EPA finds a greater wetlands impact (8.59 acres) associated with the close linkage between the turning notch component of the proposed action to be done by the USACE and that being done by the sponsor.[28]

EPA's Technical Comments

Aquatic Ecosystems – *Impacts to corals*

- EPA recommends the final EIS address the discrepancy between National Marine Fishery Service and USACE's findings regarding the occurrence of *A. cervicornis* within the study area.[29] According to NMFS, *A. cervicornis* has been documented within 150 meters of the channel whereas the draft states no *A. cervicornis* colonies have been identified within the channel or border area.
- EPA recommends the final EIS address NMFS findings the USACE coral reef impacts estimates are too low, by approximately 8.16 acres. A concern, NMFS raised back in 2011 which has not been addressed in the 2013 draft.
  - EPA recommends the USACE use the appropriate mapping scale to determine impacts associated with the proposed outer entrance channel deepening and widening component. The County appears to have demonstrated the importance of these coral resources by expending the necessary resources to appropriately characterize impacts. The proposed action represents a significant impact to the County/State's coral resources and the UACE may be able to use and build upon the County's improved mapping efforts.
    - In 2008, Broward County resurveyed the areas using updated lidar technology having higher resolution and better processing capabilities[30] to realize enhanced seafloor depictions over the 2001 survey. According to NSU, a visual inspection of these data showed that several apparent hardbottom features were not depicted in the original 2004 NSU maps made from the 2001 lidar survey data.
  - EPA notes in the mid-2000s the Florida Fish and Wildlife Conservation Commission and Nova Southeastern University, both members of the Port Everglades Research Group, recommended the offshore reefs within the proposed action's footprint be mapped at a finer scale. EPA recommends the construction impacts be re-considered consistent with NFMS determinations as supported by the corresponding State agency. EPA recognizes these entities to be the appropriate expertise for determining hardbottom/reef impacts.

- The impacts associated with construction equipment and activities do not appear to have been considered in the direct impact assessment. In addition to permanent removal, dredging is expected to dislodge coral fragments and rubble causing them to slide down the existing steep slopes to impact down slope the spur-and–grove reef habitats lying outside the dredging footprint. Moreover, it is reasonably foreseeable for the confined blasting to fracture the hardbottom, existing corals and their substrate. The ultimate likely result is an unstable reef substrate. Further increasing the difficulties to recover a damaged coral habitat and detrimentally impacting the resilience of the designated critical coral habitat.
- EPA also recommends the final EIS address NMFS concern regarding the draft's underestimation of cutterhead-dredge impacts within the outer entrance channel. NMFS estimates 19.31 acres of potential impacts compared to USACE's 17.31 acres.
- EPA recommends the final EIS provide coral/hardbottom impact information associated with the use of explosives and a mechanical excavator which is lacking in the draft.
- EPA further recommends the final EIS add a column to Table 18[31] to indicate the potential additional impacts associated with dredging/excavation equipment used.
  - For example, the draft indicates 10 additional reef impacts, plus an additional 7.13 acres assuming the worst case scenario,[32] may be associated with the use of a cutterhead dredge.[33]
  - The draft also indicates an option to cutterhead dredge is the mechanical excavator with the use confined underwater blasting with explosives to break the rock to facilitate dredging.[34] No data has been given regarding the impacts associated with a mechanical excavator or confined blasting.
  - The draft also indicates a hopper dredge has the highest likelihood of adverse turbidity and/or sedimentation effect.[35]
- EPA recommends the final EIS discuss the appropriateness of using cutterhead dredge, with its associated anchoring and cable operation in a sensitive coral reef area.
  - EPA notes the USACE indicated it *cannot dictate types of dredging equipment that a contractor may use (per the Competition in Contracting Act), so the potential remains for all of the potential contractors to propose to use a cutterhead dredge with the traditional anchor cable configuration.*[36] USACE states it can only request the selected contractor to implement an anchoring and vessel operation plan to effectively minimize anchor and cable impacts to hardbottom habitat through its Request for Proposal process, which will include incentives to encourage potential contractors to avoid reef impacts.[37]
- EPA recommends the final EIS discuss potential reef impacts associated with dredge equipment when the 5 – 7 year dredging period is interrupted by storms. As the draft noted, Florida's weather is very dynamic ranging from nor'easters associated with arctic fronts and the tropical depressions and hurricanes from the South Atlantic Ocean.[38]

- EPA recommends the final EIS address NMFS concern for the proposed action's potential to create a gap or vacuum of sufficient dimension it prohibits floating coral fragments and larvae's ability to cross and land in suitable habitat to grow and reproduce. Moreover the documented highly unpredictable offshore currents and eddies combined with the proposed deep and narrow channel may sweep larva out into the deeper waters or into the harbor,

ultimately reducing the existing designated critical coral habitat's resiliency. Another concern NMFS raised in 2011, which this 2013 draft does not address.

- EPA recommends the final EIS clarify the appropriateness of the draft's characterization of the percent of the designated critical habitat permanently removed by channel extension as an expression of the significance of the proposed action's impacts to coral habitat.
  - The draft states [g]*iven the percentage of available NMFS-defined colonizable habitat less than 0.006% (0.02 sq km) of the FL DCH unit would be permanently removed by the TSP's construction.*[39]
  - EPA finds this characterization does not adequately reflect the nature of the complex reef dynamics, these reefs exist near the northern limit of reef growth, nor appropriately characterize their value, both economically and ecologically. Moreover, it is inconsistent with the impact determinations and associated mitigation protocol.
- EPA recommends the final EIS clarify the draft's explanation of the methodology used to calculate impacts for mitigation purposes.
  - Several different hardbottom/reef impact acreage numbers appear throughout the draft and its appendices. The Executive Summary indicates 15.23 acres.[40] Direct dredging impacts are indicated to total 16.66 acres.[41] Appendix E-2 refers to 16.64 acres.[42] While Appendix E refers to 15.17.[43] It is unclear where these numbers come from. It was stated without any discussion or explanation, the revised lower number of 15.17 resulted from engineering modifications and better mapping.
  - The discussion of impact scenario 2 is very confusing. The first paragraph indicates no impacts would occur associated with cables and anchors. Then the following paragraph indicates anchor-cable impacts were calculated at 7.40 acres.[44] It is unclear whether anchor and cable impacts will occur under Scenario 2.
  - The draft mentions USACE's contractor, Dial Cordy and Associates, mapped the area[45] using video cameras[46] and benthic assessments, but no mapping protocols were provided to describe how the mapping was performed.
  - Figure 59 cites the habitat maps but no discussion was provided to explain how the polygons were drawn, their criteria, or purpose.[47]
  - Appendix E is unclear whether the calculations were for a 57 or 59 foot depth.[48]
- EPA recommends the final EIS discuss how it derived its *Species specific impact* as depicted in Tables 2-5.[49]
- EPA recommends the final EIS change the word "buffer" to different word because it is being to reference the cutterhead dredge anchor placement: 150 meters from the channel's edge.[50] This identified "buffer" area is the area being directly impacted by the proposed action's potential use of a cutterhead dredge and its associated anchors. Moreover, its use is inconsistent with the draft's proper use of *buffer*, e.g., marine mammal protection zone from confined underwater blasting,[51] a buffer against poor recruitment years,[52] and mangrove buffer in context of sawfish habitat.[53]
- EPA recommends the final EIS clarify the draft's position the USACE revised the reef impact amount based upon refined engineering analysis, higher resolution habitat maps, refined construction timelines to modified the project's duration, and indirect effects associated with vessel movements as a result of the economic analysis. The draft provided no explanation how these factors revised the number of injured areas depicted in Tables 6 – 10.[54]

Aquatic Ecosystems – *Impacts to Seagrasses*

- EPA recommends the final EIS clarify the draft's seagrass impacts identified as 4.01 acres when it is our understanding the cumulative impacts associated with the Tentatively Selected Plan is approximately 9.492 acres.[55]
  - EPA recommends the final EIS clarify why the draft[56] does not include:
    - The 1.06 acre of seagrass, and corresponding mitigation, National Marine Fisheries Service's identified in the outer entrance channel in its assessment area number 1.[57]
    - The 2.071 acres of seagrass, and corresponding mitigation, NMFS' identified in the harbor in its assessment area number 2.[58]
  - EPA recommends the final EIS clarify why the draft[59] is inconsistent regarding seagrass acreage impact calculations with NMFS.
    - USACE's 0.08-acre determination for the inner entrance channel is inconsistent with NMFS' 0.698 acre determination in its corresponding assessment area number 3.
    - USACE's 5.01-acre determination for both the widener and south access channel is inconsistent with NMFS' 5.681 acre determination for its corresponding assessment areas number 4 and 5.
    - USACE's 3.26-acre determination for the widener is inconsistent with NMFS' 4.647 acre determination.
  - EPA further recommends the seagrass impacts be re-considered consistent with NFMS determinations as supported by the corresponding State agency. EPA recognizes these entities to be the appropriate expertise in the science of fisheries and their associated habitats, i.e., seagrasses.
    - EPA recommends the final EIS clarify why the USACE's snapshot approach to assessing seagrass impacts is based upon the best available science and should be used over NMFS' cumulative cover approach, which NMFS' maintains is best supported by the available science.

Aquatic Ecosystems – *Impacts to Mangroves*

- EPA recommends the final Feasibility Study describe which the draft does not, how impact acres to mangrove and reef/hardbottom habitat were determined.[60]
- EPA recommends the final SEIS clarify the draft's statement *the USACE has determined that although no filling of jurisdictional wetlands will occur as a part of the proposed action....*[61] The draft EIS indicates the proposed installation of *environmentally friendly bulkheads* will impact jurisdictional wetlands.[62]

Aquatic Ecosystems - *Impacts*

- EPA recommends the final EIS address its independent technical review panel[63] concerns the draft does not address all the requirements of the Endangered Species Act, National Environmental Policy Act,[64] and Water Resources Development Act.[65]
- EPA recommends the final EIS discuss port and beach renourishment projects located in the two adjoining coastal counties as part of the cumulative impact analysis.
- EPA recommends the final EIS discuss the sponsor's dredging of the turning notch and the Dania Canal Cutoff,[66] which outside sources report started in July of 2013[67] as part of the

cumulative impact analysis, including impacts upon the proposed mitigation bank, West Park Lake.

Aquatic Ecosystems - *Mitigation – corals/hardbottom*

- EPA recommends the USACE further address the National Marine Fisheries Service's mitigation coral nursery proposal to propagate coral and support active coral reef enhancement for the benefit identified in the draft: … *it is designed to maximize the chances of successful natural coral reproduction; larval transport; settling and colonization into new areas; and genetic mixing required for survival and recovery of the species*[68] combined with the USACE proposal to create boulder reefs, i.e., substrate for NMFS to colonize using nursery stock.
  - NMFS' proposal when compared to the USACE's passive, boulder reef approach has environmental data to support its potential for success. However, the question remains as to whether the proposed action's impacts to coral reefs will ever be appropriately mitigated. As noted in the draft, these are high-latitude reefs, existing near the northern limit of reef growth,[69] not in optimal growing conditions, and they exist in a higher stress environment making mitigation efforts challenging at best.
  - The draft presents only a few papers supporting the use of boulders as appropriate mitigation for lost natural reef habitat. However, a number of studies refute the effectiveness of the proposed mitigation and its purported equivalency to natural habitat. There are few long term studies of artificial reefs pertaining directly to the issue of compensation for function and services of a natural reef.
- EPA recommends the final EIS clarify the draft's apparent misstatement of Port Everglades Reef Group's compensatory mitigation recommendations. PERG's recommendation appears to be for a minimum advisable size of 12-15 cm colonies.[70] However the draft indicated states [o]*ne notable recommendation of PERG that will be implemented is the transplantation of corals larger than 25 cm in diameter/height to the mitigation site.*[71]
  - EPA recommends the transplanting of corals should be consistent with NFMS determinations as supported by the corresponding State agency. EPA recognizes these entities to be the appropriate expertise for addressing coral mitigation.
- EPA recommends the final EIS address both the National Marine Fishery Service's and USACE's independent own independent technical peer review findings[72] regarding the use of boulder piles and its assumption they will reach 100 percent equivalency with natural coral reefs in 30 years. The USACE's use of Habitat Equivalency Analysis to make this 100 percent equivalency finding introduces potentially significant uncertainty regarding the actual achievement of 100 percent.
  - USACE in its HEA determinations inappropriately used a "0" discount rate and indicated it did so in compliance with OMB Circulars and Corps regulations and guidance. [73]
    - However, the referenced OMB Circular specifically exempts from its scope water resource projects.[74] It does not prohibit the proposed action from the use of discount rates greater than "0." Nor does the guidance for the exempted water resource projects[75] prohibit the use of discount rates.
    - EPA recommends some discount rate greater than 0 percent be used in USACE's HEA analysis in order to attempt to provide sufficient mitigation because the value or services provided by the habitat and communities removed and injured by dredging will

be lost for decades[76] by all estimates and may never achieve 100 percent recovery to present value.

- For example, a 3-percent discount rate with the assumption the USACE's proposed boulder mitigation will upon maturity reach 50 percent, not 100, of the natural reef services has been proposed.
- EPA recommends the discount rate should be re-considered consistent with NFMS determinations as supported by the corresponding State agency. EPA recognizes these entities to be the appropriate expertise for calculating the appropriate HEA.

- Additionally, USACE's underestimation of impact acreage to corals and hardbottom, as discussed in the above comments on impacts, further adds to the significance of the HEA analysis' uncertainty.
- EPA recommends the final EIS discuss how the HEA input parameters were selected and whether agreed to by all parties. According to the draft, much appears to have been decided at meetings without clear documentation for those not present at these deciding meetings. No justification has been provided in the draft to justify the actual parameters used.

- EPA recommends the final EIS identify appropriate compensatory mitigation for the "best buy" mitigation plan[77] as proposed should the transplant survival rate be lower than the performance criteria value for the transplantation of stony coral colonies to boulder reefs or alternate locations.
- EPA recommends the final EIS clarify and provide a scientific basis for the drafts' statement the transplantation of corals onto mitigation reefs will reduce the time to *substantial functional productivity* by as much as 20 years.[78] Functional productivity requires the octocorals, sponges, reef fishes and other reef biota be present with community structure similar to pre-impact conditions.
- EPA recommends the final EIS clarify the drafts' apparent double counting of mitigation credits for one action. According to the draft EIS,[79] the total number of corals to be dredged is 100,744. Its cost estimate indicates the relocation of up to 12,235 corals outside of the impact area to boulder- reef recovery areas, a 12% reduction in impact. EPA recommends this impact minimization measure be reflected in a corresponding reduction in compensatory mitigation requirements. It would be inappropriate to also grant compensatory mitigation credit to the boulder reef recovery areas receiving the coral transplants.[80] The effect is getting credited twice for the same action.
- EPA recommends the final EIS clarify during the proposed five year monitoring period how it will be determined that 100% equivalency of natural reef habitat has been achieved when it is expected take decades after boulder reef construction to achieve 100 percent, assuming 100 percent can be achieved. EPA believes it is unlikely in five years to achieve *75% of species found in the impact site shall be present in the mitigation site by the time of the completion of the monitoring period; and percent cover by the major groups of organisms in the mitigation site shall be no less that it was in the impact site.*[81]

Aquatic Ecosystems - *Mitigation – mangrove wetlands*

- EPA recommends the final EIS fully account for all aquatic ecosystem impacts and clarify the draft EIS' allegations of avoidance and minimization of mangrove wetlands and seagrasses. The USACE show cases dropping the turning notch and Dania Cutoff Canal

projects from the proposed action as example of its mitigation avoidance[82] in response to stakeholder concerns.[83] EPA encourages the USACE to explain how these wetlands and seagrasses impacts will be *avoided* when the sponsor will likely have destroyed them prior to the proposed action's initiation. EPA also encourages USACE to explain how its proposed avoidance effectively addressed the concerns of its stakeholders.

- The USACE takes credit for avoiding impacts to 8.59 acres of red and black mangrove wetlands[84] by dropping the turning notch widening/deepening component for economic reasons[85] while knowing the federal sponsor will remove these same wetlands[86] to implement the original, federally proposed, turning-notch widening proposal and to deepen up to 42 feet of the original 50 foot design. The draft EIS indicates the sponsor already has initiated permitting discussions and held a pre-application meeting in August, 2012. Moreover after being deepened to 42 feet by the sponsor, USACE intends take action to further deepen the notch to 52 feet.[87]
  - EPA notes the draft EIS describes these mangroves to be removed as: [t]*his mangrove area is mitigation for previous wetland impacts associated with the Turning Notch Project (DC&A 2001). During the interagency site visit in May 2008, it was noted this area contains a mature mangrove community and the riprap revetment between the mangroves and open water appears to provide sufficient spacing to allow for detrital exchange and fishery resource access."*[88]
- The USACE also takes credit for avoiding significant impacts to mature red and black mangrove wetlands,[89] by dropping the Dania Cutoff Canal component for economic reasons.[90] Hence avoiding18.49 acres of mangrove wetlands.[91] The Dania Cutoff Canal component is now considered to be a non-federally sponsored project,[92] for which dredging commenced in July of 2013.[93] The draft EIS did not discuss USACE's approval of the sponsor's permit for this project.[94] EPA notes the dredged material is being disposed of in a landfill instead of being disposed into the Port Everglades offshore dredged material disposal site.
  - EPA notes the proposed mitigation for removing these 8.6 acres by the sponsor remain undetermined.[95]
- EPA recommends the final EIS clarify the draft's claim [t]*he tentatively selected plan now proposes to impact only approximately 1.16 acres of mangroves.*[96] The Turning Notch project will impact an additional 8.59 acres. And the Dania Cutoff Canal project impacted an additional 18.49 acres for a total 28.4 acres of mangrove impacts for which mitigation is only being proposed for 1.16 acres.
- EPA recommends the final EIS clarify whether the proposed action's mangrove impacts will affect habitat created by the Port as mitigation for previous impacts to native areas of mangrove.[97]

Aquatic Ecosystems - *Mitigation – seagrasses*

- EPA recommends the final EIS clarify the proposed action's seagrass impacts and associated mitigation. The draft states mitigation to offset impacts to 4.01 acres of seagrass will occur at West Lake Park.[98] EPA understands seagrass impacts may exceed 9 acres. See Aquatic Ecosystem – impacts comments below.
- EPA recommends the final EIS clarify how West Lake Park creates sufficient seagrass mitigation credit to offset 4.01 to 9.49 acres of seagrass impacts associated with the proposed action.

- EPA recommends the final EIS clarify how the best available science and scientific literature supports mitigation of seagrasses at the West Lake Park and is consistent with the federal mitigation rule's requirements. [99]
- EPA recommends the final EIS address the National Marine Fishery Services' concern regarding Port Everglades seagrasses habitat value to two federally managed species: the gray snapper and blustriped grunt, which is a function of distance from the ocean and inlet which West Lake Park cannot adequately compensate.
- EPA recommends the final EIS identify how many mitigation credits are available at West Park Lake.
  - The draft states [t]*o offset impacts due to implementation of the TSP, 2.4 seagrass functional units* … will be provided by West Park Lake.[100] This is to mitigate the draft's identified 4.01 seagrass acres impacted.
  - However, USACE permit SAJ-2002-0072 has authorized only 2.22 seagrass credits.
  - Moreover, NMFS has identified 9.492 acres of seagrass impacts requiring 5.25 seagrass credits.

- EPA recommends the FEIS identify and discuss alternative mitigation plans should West Lake Park provide insufficient mitigation to offset proposed action's impacts.
- EPA recommends the FEIS explain how the seagrass UMAM scores were determined. [101]
- EPA recommends the final EIS clarify the draft EIS' claim it avoided 0.66 acres of seagrasses associated with dropping the Dania Canal Cutoff component since the sponsor currently is dredging this canal.[102]

Aquatic Ecosystems - *Mitigation*

- EPA recommends the final EIS clarify the Port Everglades Navigation Project Mitigation Plan[103] will be in compliance with the *Federal Compensatory Mitigation Rule*, dated April 2008. [104]
- EPA recommends the final EIS address its peer review panel concerns, as the draft did not, regarding the adequacy of the draft's discussion on avoidance, minimization, and mitigation measures for unavoidable impacts to identified resources and ESA-listed species such as the federally threatened Johnson's seagrass (*Halophila johnsonii*).[105]
- EPA recommends the final EIS discuss additional avoidance and minimization measures in accordance to the Clean Water Act[106] because the mangroves, sea grass and coral/hardbottom communities in the area are aquatic resources of national importance. EPA agrees with the Corps finding in the draft EIS: [m]*any of the natural resources in the project area are considered significant under the Corps planning guidance.*[107]
- The EPA requests the final EIS clarify the draft's use *adopted primary* mitigation plan as presented in Table 35.[108] This language appears to be a final statement on proposed mitigation for project impacts when significant doubt exists regarding the proposed mitigation's adequacy.

Water Quality – *public water supplies*

- EPA recommends the final EIS discuss the ground-water related studies conducted to determine the potential impacts to potential public groundwater supplies associated with the proposed construction.

- The draft's conclusion no substantial impacts to water supplies is expected[109] does not appear to have been supported by a ground water study, which has been done for other port deepening projects, e.g., Savannah and Jacksonville Harbors.
  - For example, there is no information on the whether the cone of depression associated with the nearest municipal water-supply well-field will be impacted. For large municipal wells, cones of depression can extend many miles from the pumped well. The four-mile distance of the nearest municipal water supply well field does not preclude impacts associated with the proposed action's construction.[110]
    - Moreover, the fact that the shallow aquifer is not now used for public water supply does not preclude its current use for private water supplies or for future use as public water supply.
  - One concern is the proposed blasting may facilitate increased porosity and transmissivity of seawater into ground-water dependent public water supplies, particularly during storm events and high tides by fracturing associated with the proposed blasting.[111, 112, 113, 114] South Florida's geology is extensive karst limestone which is very hydraulically conductive. The USACE proposes each blasting charge to be placed in a drilled hole 5-10 feet deep **below** the desired depth,[115] e.g., 57 feet. This blasting may facilitate increased porosity and transmissivity of seawater into ground-water dependent public water supplies, particularly during storm events and high tides.

- EPA recommends the final EIS describe the proposed action's construction impacts to the surficial-aquifer system. The draft does not provide information on how the proposed action will cumulatively affect previous harbor dredging impacts to the surficial aquifer. Nor does it provide any rock-removal volume estimates. No discussion has been provided describing rock-removal impact's the aquifer's porosity and ability to transmit sea water associated with public water supply well-draw downs.

Water Quality – *nutrients*

- EPA recommends the final EIS provide environmental information regarding the proposed action's impacts to nutrient concentrations of the coastal waters. As the existing deepest channel in the vicinity, the Port Everglades Inlet represents the largest source of potential pollutant loads from inlets to the coastal ocean in Southeast Florida.[116] Moreover, Figure 62 depicts the inner and outer entrance channel as a point source of fecal coliforms, enterococci, and *Clostridium perfringens*.[117, 118] EPA notes the referenced USGS study only sampled for microbial constituents of human sewage, and did not include sampling for nutrients.
- EPA recommends the final EIS address those studies indicating the water in the inner entrance channel contains higher concentrations of nutrients compared to levels typically seen in the coastal ocean.[119, 120] Enlargement of the channel may potentially increase the flux of these substances out of the inlet and into the coastal ocean. Moreover, the proposed blasting will potentially significantly increase the groundwater –surface water interface potentially increasing the nutrient enriched ground water to discharge into surface water.
  - The Port Everglades Flow study results indicate the possibility for the upper water column inside the inner entrance channel (the part of the water column most likely to contain excess nutrients and microbial contaminates) to flow in an opposite direction from the lower water column. As stated in sub-appendix C, RMA-2 is a depth-averaged 2D model

and will not resolve the vertical features of the channel water column. These features, however, may be important when considering impacts within the vicinity of the inlet, e.g., nutrient enrichment concerns.

Water-Quality Impacts – *Turbidity*

- EPA recommends the final EIS evaluate the potential turbidity effects to water quality during the estimated five-seven years of dredging and blasting. Without information to support its conclusions, the draft states water quality impacts are expected to be inconsequential,[121] temporary, and no foreseeable future actions resulting in a cumulative effect.[122]
- EPA recommends the final SEIS fully evaluate the long-term turbidity effects associated with larger ships using a deeper navigational channel. Larger ships are expected to create larger wakes, potentially increasing shoreline erosion effects, and potentially disturbing and re-suspending bottom sediments. Additionally the widening effect associated with the proposed deepening may expose more surface area of unconsolidated sediments to erosion.
- EPA recommends the USACE consider avoidance and minimization techniques to reduce these potential environmental consequences and identify appropriate mitigation to address this concern.

Offshore Dredged Material Disposal Site (ODMDS) Impacts

- EPA recommends the final EIS clarify the deepening and expansion material has not been tested or evaluated pursuant to the Marine Protection, Research and Sanctuaries Act. By stating [i]*mpacts associated with disposal activities at the USEPA designated and authorized ODMDS have been reviewed and addressed in USEPA's 2005 EIS for the designation of the Port Everglades ODMDS. The USACE ... hereby incorporates those analyses into this EIS ...* .,[123] the draft implies the dredged material to be disposed offshore is suitable for ocean disposal without further analysis, study, or testing, which is not a factual determination. See ODMDS comments below.
- EPA recommends the final EIS discuss the impacts to the proposed action should a significant volume of dredged material be unable to meet the required ocean dumping criteria, prohibiting the use of the preferred disposal option, ocean disposal off shore.[124] It remains unknown whether any of this material will meet ocean dumping criteria, require special management practices, or a non-ocean disposal site.
- EPA recommends the final EIS clarify the deepening and expansion material has not been tested or evaluated pursuant to the Marine Protection, Research and Sanctuaries Act. The draft EIS states: [s]*ediments sampled within the OEC, IEC, NTB, MTB, and STB have been tested and found suitable for ocean disposal ...* [125] which appears to imply the material associated with the proposed action has been tested and found in compliance with the ocean disposal criteria. The sediments tested in 2004 were the maintenance material dredged and disposed of in 2006, which is no longer in the basin. Additionally, the harbor has been maintenance dredged at least twice since 2004.
- EPA recommends the final EIS clarify the draft's inconsistent statements. It states, [n]*o sources of pollutants or contaminants have been identified within the construction or disposal areas.*[126] However, it also states, [a]*lthough industrial facilities exist in the area that may have a potential for release of toxic materials, the materials most likely to be discharged are petroleum hydrocarbons, small, undocumented chemical spills, and stormwater runoff from large container and freight yards.*[127] EPA agrees the latter describes potential pollution

and contaminant sources within the construction area, which might impact the material to be dredged and its potential compliance with the ocean disposal criteria.

- EPA recommends the final EIS provide the Tier I analysis Appendix J. The draft indicates it has been performed and is in Appendix J,[128] which it is not. Moreover, Appendix J does not address the requirements of the MPRSA or follow any national or regional guidance for performing a Tier I evaluation.
  - EPA requests the USACE provide it an appropriate Tier I analysis for review prior to the final EIS, since EPA was unable to determine from the draft EIS whether it was consistent with national and regional testing guidance.
- EPA recommends the final EIS clarify it is Section 103, not Section 102 of the MPRSA authorizing the USACE to designate a one-time use of a disposal site.[129]
- EPA recommends the final EIS describe the proposed artificial mitigation site to facilitate the appropriate CWA Section 404 compliance determination. It is not described in the draft.[130] At a minimum, the description should include the site's location and the substrate's characteristics. It is impossible to make a factual determination of compliance without an appropriate description of the proposed disposal site.
- EPA recommends the final EIS clarify the decision not to incorporate the site designation into this draft Port Everglades EIS was a joint EPA/USACE, not solely EPA's.[131]
- EPA recommends the final EIS clarify the ocean dumping criteria are based on a suite of tests including chemical and biological tests, not just chemical testing as implied in the draft.[132]
- EPA recommends the final EIS clarify the dredged material disposed at the ODMDS is not regulated under the Clean Water Act and therefore the CWA's Section 404(b)(1) evaluation guidelines are inapplicable to the ODMDS' use.[133]
- EPA recommends the final EIS define what part of the approximately six million cubic yards is expected to be rock removed (i.e., from the surficial aquifer). The draft indicates a significant quantity of rock will require blasting; approximately 40-50% of the material in the main, south, and north turning basins.[134]

Sea Level Rise

- EPA recommends the final SEIS discuss the effects of anticipated sea-level rise over the 50-year project life in context of the need to construct the proposed action to the proposed depth to accommodate the design vessels. Whether sea-level rise may naturally provide some increased water depth to facilitate deep-draft vessel passage without going to the full TSP depth.
- EPA recommends the final SEIS discuss how the proposed action will incorporate any revisions to the USACE's existing guidance,[135] which expires on September 30, 2013, to reflect updated scientific findings over the proposed action's life.

Storm Surge

- The FEIS should discuss how the storm-surge impact analysis was performed, the assumptions made, and confidence in any model derived results. The draft indicates no storm-surge modeling or analysis was performed.
  - EPA recommends this analysis discussion include worst case scenarios, e.g., slow moving, category 5 hurricane occurring at a high tide with the three sea-level rise

scenarios: baseline, intermediate, and high over the 50-year project life consistent with current USACE guidance.[136]
  - EPA recommends this analysis discussion indicate whether the ADCIRC storm surge simulations were used. E.g., the USACE's Sabine Neches study.[137]
  - EPA recommends this analysis discussion indicate where the changes in peak surge occur in the area associated with the proposed action and what is being impacted. Infrastructure? Residential Areas? The Barrier Island?
  - EPA recommends this analysis discussion describe the cumulative effect of storm-surge and sea level impacts based upon the USACE's existing sea level rise guidance: the three sea-level rise scenarios: baseline, intermediate, and high over the 50-year project life.
- EPA recommends the final SEIS discuss the effects of a deepened channel allowing a greater volume of seawater to penetrate the harbor upon the surrounding areas including environmental justice communities, public water supply facilities, wastewater treatment facilities, and other public infrastructure.
  - Flooding, erosion, and salt-water intrusion through the porous limestone unit of the surficial aquifer are potential concerns associated with storm surges. The proposed action could possibly breach up to ten[138] or more feet of the surficial aquifer creating extensive fractures facilitating new dissolution areas within the existing karst.
  - A concern exists for impacts associated with large, slow moving storm events upon areas already susceptible to storm-surge flooding. It is unclear whether the proposed action may exacerbate the storm-surge impacts and associated flooding risk of smaller storms than under existing conditions.
  - EPA recommends the final SEIS discuss storm-surge impact in context of low and high tides, previous histories of major storm-surge impacts, and sea-level rise.
  - EPA recommends the final SEIS' discuss the effects of a deepened channel allowing a greater volume of seawater to penetrate the harbor upon the J.U. Lloyd Beach State Park, the harbor's mangrove wetlands and seagrasses.
  - EPA recommends the final SEIS consider appropriate mitigation measures (e.g., informing the local county's public utilities and emergency management program to allow them to update their storm surge maps, evacuation procedures, increasing storm-water retention areas, etc.).

Air Quality –

- EPA recommends the USACE continue to explore with the applicant additional measures to reduce fossil-fuel use during construction. Additionally, the USACE and applicant should consider mitigative measures for port operations, such as additional repower/electrification of container handling equipment, improved logistics related to container movement, port locomotive idle and shut-off policies, use of biodiesel blends, etc.[139]

- EPA recommends the final EIS identify any sensitive receptors within 1,500 feet (approximately 500 meters) from all air-toxics emission sources because the draft EIS did not address air toxics. Sensitive receptors include hospitals, daycares, nursing homes, schools and other at risk populations. EPA recognizes a substantial area around the port is industrialized. Based upon a cursory review of the study area on EPA's NEPAssist program, no schools or hospitals could be identified within 1,500 feet of major port facilities. EPA

requests the USACE identify any potential near-facility sensitive receptors and confirm this information in the final EIS.

Environmental Justice & Children's Health

- Environmental Justice
  - EPA recommends the final EIS provide more information on how it meets Executive Order 12898.[140] The draft generally states the project would benefit shipping and general economy including low –income and minority populations, no identified minority or low income populations were identified in the study area or that would be affected by the project, and stakeholder involvement approach provided a variety of opportunities for affected communities to be involved.[141] No supporting information was provided regarding the above conclusions.
  - EPA recommends the final EIS include demographic information and maps to support its statements made regarding the lack of minority and low-income population in the study area and surrounding community. If the demographic analysis identified any minority and low-income populations, efforts made to meaningfully engage these populations in the decision-making process should be identified including a brief summary of any EJ comments or concerns identified along with USACE's response. In addition, any potential environmental and human health impacts should be identified along with any efforts to avoid, minimize or mitigate the effects. Furthermore, if the project benefits are anticipated for communities with EJ concerns, supporting information should be provided.
- Children's Health
  - EPA recommends the final EIS address impacts to children pursuant to Executive Order 13045[142] pertaining to children's health and safety which directs each Federal agency to make it a high priority to identify and assess environmental health and safety risks disproportionately affecting children and to address these risks.
  - EPA recommends the final EIS include an analysis of impacts to children if there is a possibility of disproportionate impacts related to the proposed action. The analysis and disclosure of potential effects under NEPA is important because physiological and behavioral traits of children render them more susceptible and vulnerable to environmental health and safety risks. Children may have higher exposure levels to contaminants because they generally have higher inhalation rates, eat more food, and drink more water, and relative to their body size. In addition, a child's neurological, immunological, digestive, and other bodily systems are also potentially more susceptible to exposure-related health effects. It is well documented that children are more susceptible to many environmental factors that are commonly encountered in NEPA projects, including exposure to mobile source air pollution, diesel emissions, particulate matter and heavy metals. As mentioned in the Air Quality comments above, the final EIS should identify sensitive receptors such as schools, daycares, and hospitals located near the proposed project area and clearly describe the potential direct, indirect, and cumulative environmental and human health impacts to children.

Editorial Comments –

- EPA recommends the final EIS clarify Figure 13, in the draft EIS, it shows a proposed channel depth at 56 feet[143] but the action proposes an effective 57 foot depth.[144]
- EPA recommends the final EIS clarify the draft EIS' inconsistencies in the turning notch depths. The draft SEIS text indicates USACE plans to deepen the turning notch from 42 to 52 feet[145] but Figure 5 indicates the USACE will deepen to 48 feet.[146]
- EPA recommends the final EIS clarify the projected number of vessel calls for the no action and the proposed action and be consistent throughout the text.
  - The draft EIS indicates the 2060 no action projects are for a minimum of 5,193 vessels calling annually, an increase from the pre-2012 baseline of more than 1,163 vessels annually.[147]
  - The draft EIS indicates the No Action analysis estimates 5,163 vessel calls in 2060, an increase in the 2012 level of 1,646 calls.[148]
  - The draft also states *with* project vessel calls in 2060 are estimated to be 8,693, one call less than estimated *without* project.[149]
  - The draft also states *with* project vessel calls in 2060 are estimated to be equal to or less than the without-project vessel calls.[150]
  - The draft also states the 2060 no action projects 8,984 vessel calls; an increase of 3,691 from 2012 baseline, and 1 call less than with the TSP, 8,983 and the proposed action 2060 calls are projected to be 8,983, one less call than the no action.[151]
  - The draft also states the no action, 2060 vessel project is 5163 while the proposed action's 2060 vessel projection is 5,067.[152]
  - The draft also states the estimated vessel calls *without project* – 8,983 in 2060 and *with project* – 8,983 in 2060.[153]
  - The draft also states the no-action alternative would involve a continued increase in ship calls from the 4,000 vessel call 2012 baseline. The future 2060 *without project* estimate is 5,163 vessel calls an increase of 1,646.[154] EPA's calculator finds 4,000 + 1,646 does not equal 5,163.
- EPA recommends the final EIS clarify Figure 62 as the draft EIS references it for two different figures.[155]
- EPA recommends the final EIS improve on the draft EIS' Figure 64 to make it readable.[156]
- EPA recommends the final EIS make Figure 74 readable.[157]
- EPA recommends the final Feasibility Study clarify where the UMAM calculations are provided. They were not provide in Appendix B of the draft EIS as indicated in the draft Feasibility Study.[158]
- EPA recommends the final Feasibility Study clarify where PERG's Draft Compensatory Mitigation Recommendations can be found. They were not provide in Appendix B of the draft EIS as indicated in the draft Feasibility Study.[159]
- EPA recommends the final EIS reflect updated population numbers as the draft EIS states Florida's 2010 population was 1,748,066.[160]
- EPA recommends the final EIS add TSP to the Acronyms/Definitions of terms list.[161] For example, the draft EIS' Table 18 provides information regarding the habitat impacts of the TSP by plan component but TSP is undefined.[162]
- EPA recommends the final EIS reflect the correct spelling of artificial in the Section 7.2.3 header.[163]

- The draft EIS states [m]*angrove mitigation requirements were determined using the State of Florida's Uniform Mitigation Assessment Method (UMAM) assessment*." It should be Seagrass, not Mangrove.[164]
- EPA recommends the final EIS clarify the draft's statement [u]*navoidable impacts to mangrove wetlands will be mitigated by using credits (functional units) generated by habitat improvements at West Lake Park.*[165] It should be seagrass, not mangrove.

Region 4 EPA Contacts:

Consistent with EPA/USACE discussions, EPA offers its assistance to address our identified concerns with this draft SEIS prior to publication of the final. The following is a list of staff, their contact information, and expertise areas.

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[1] Section 1.2, p. 2.
[2] Section 3.14, p. 167.
[3] Section 3.18, p. 166.
[4] Section 3.14, p. 167.
[5] Section 3.18, p. 166.
[6] Section 3.18, p. 166.
[7] P. Section 3.8, p. 167.
[8] E.S., p.1.
[9] Section 1.2, p. 2.
[10] Section 1.4, p. 9 – FS.
[11] Section 1.4, p. 8 – FS.
[12] Section 2.2.2, pp. 19 – 22.
[13] Section 2.3.2, p. 27.
[14] 16 USC § 1431 et seq. and 33 USC §1401 et seq. (1988).
[15] Section 2.3.2, p. 27.
[16] Section 2.3.2, p. 27.
[17] Section 2.3.2, p. 27.
[18] Section 2.3.2, p. 27.
[19] Section 3.6.2, p. 108.
[20] Section 3.6.2, p. 108.
[21] Section 2.5.5, p.40.
[22] Section 3.17, p. 162.

[23] Section 3.17, p. 162.
[24] Section 3.9.1, p. 147.
[25] Section 4.5.10.2.2, p. 209.
[26] Section 4.4.1.2., p. 176 and Section 4.5.2.2, p. 191.
[27] Section 4.3.2, p. 172.
[28] Section 2.7.1, p. 44.
[29] Section 4.5.10.2.1, p. 208.
[30] Guilford, J.; Robertson, W.; Ramsay, S., 2008. Evolution of the LADS MkII ALB System: A Comparison of the 2001 and 2008 Broward County Lidar Surveys. Available at http://www.thsoa.org/hy09/0512P_04.pdf .
[31] Section 4.3.2, p. 173.
[32] Section 4.5.10.2.2, p. 211.
[33] Section 4.4.2.2, p. 179.
[34] Section 2.9.1, p. 47.
[35] Section 4.5.10.2.3, p. 213.
[36] Appendix E-2, Section 4.51, p. 12.
[37] Section 4.5.10.2.2, p. 211.
[38] Section 3.3, p. 87.
[39] Section 4.5.10.2.4, p. 220.
[40] P. iv.
[41] Section 4.4.2.2, p. 177.
[42] Section 4.5.1 , p.12.
[43] Section 6.1, p. 22, Table 8, p. 33, and Table 11, p. 37.
[44] Appendix E-2, Section 4.51, p. 12.
[45] Appendix E, Section 1.0, p. iv.
[46] Section 3.6.2, p. 111.
[47] Section 3.7.2.13, p. 137 and p. 140.
[48] Appendix E, Section 6.3.5, p. 34, and Table 10, p. 35.
[49] Appendix E-2, Section 4.5.1.1.1, pp. 13-15.
[50] Section 4.5.10.2.2, p. 211.
[51] Section 2.9.3.2.3, p. 72.
[52] Section 3.6.3.3, p. 117.
[53] Section 3.7.2.2, p. 121.
[54] Appendix E-2, Section 4.6, pp. 17 - 21.
[55] Section 4.3.2, Table 18, p 173.
[56] Section 4.3.2, Table 18, p 173.
[57] Section 3.6.1.1, Figure 49, p. 101.
[58] Section 3.6.1.1, Figure 49, p. 101.
[59] Section 4.3.2, Table 18, p 173.
[60] Section 8.11, p. 138 – FS.
[61] Section 4.7.1, p. 221.
[62] Section 2.7.1, p. 44.
[63] Final Independent External Peer Review Report, Science Reports for the Port Everglades Harbor, Florida, Feasibility Study and Environmental Impact Statement (EIS), by Battelle for USACE Ecosystem Restoration Planning Center of Expertise Rock Island Division (August 17, 2011).
[64] NEPA documents shall use data and incorporate findings from analysis required by other environmental laws (e.g., ESA and the Clean Water Act) to assess the project's effects on listed species and wetland resources and to evaluate avoidance or minimization measures.
[65] WRDA 2007 (Section 2036), projects under the USACE Civil Works program need to ensure that *all significant impacts to ecological resources have been avoided and minimized ... and, unavoidable impacts compensated to the extent practicable.*
[66] Section 4.29.2, Table 38, p. 249 does not include the Dania Cutoff Canal project.
[67] Dania Cutoff Canal Deepening Project Kicks Off, July 10, 2012, see:
http://www.dredgingtoday.com/2012/07/10/dania-cutoff-canal-deepening-project-kicks-off-usa/
[68] Section 5.2.3, P. 260.

[69] Section 3.6.2, p. 108.
[70] *Recommendations of the Port Everglades Reef Group Regarding Compensatory Mitigation for Navigational Improvements at Port Everglades Harbor* (May 2005) Section 7.6, p. 25.
[71] Appendix E, Section 6.2, p. 23. See also Section 7.2.3, p. 123 – FS.
[72] Final Independent External Peer Review Report, Science Reports for the Port Everglades Harbor, Florida, Feasibility Study and Environmental Impact Statement (EIS), by Battelle for USACE Ecosystem Restoration Planning Center of Expertise Rock Island Division (August 17, 2011).
[73] Appendix E, Section 1.0, p. iv.
[74] OMB Circular A-94.
[75] Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (1983), available at ftp://ftp-fc.sc.egov.usda.gov/Economics/priceindexes/Data/PrinciplesAndGuidelinesLocalSite.pdf
[76] The draft EIS indicates, without supporting data or studies, [t]he interval required to reach substantial functional productivity of this alternative is estimated to be 30-50 years. And also states without supporting data or studies, its proposed mitigation will shorten this interval to 23-30 years. See: Section 5.2.2, p. 259.
[77] Appendix E, Section 6.3.4, p. 34, and draft EIS, Section 5.2.2, p. 258.
[78] Section 5.2.2, p. 259.
[79] Appendix E2.
[80] Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, 40 CFR Part 230 (2008).
[81] Appendix E-5, Monitoring Plan, p. 19.
[82] ES, p. iv.
[83] Section 1.6, p. 16 – FS.
[84] Section 2.7.1, p. 44.
[85] Section 2.5.5, p. 40 and Figure 9, p. 40.
[86] Section 2.2.2, Figure 5, p. 20.
[87] Section 2.5.5, p. 40.
[88] Section 3.5.2, p. 93.
[89] Section 2.5.5, p. 40.
[90] Section 2.5.5, p. 40.
[91] Section 2.7.1, Table 7, p. 45.
[92] Section 1.4.6, p. 10 - FS.
[93] Dania Cutoff Canal Deepening Project Kicks Off, July 10, 2012, see: http://www.dredgingtoday.com/2012/07/10/dania-cutoff-canal-deepening-project-kicks-off-usa/
[94] Section 4.29.2, Table 38, p. 249 does not include the Dania Cutoff Canal project.
[95] Section 4.29.2, Table 38, p. 249.
[96] Section 7.2.1, p. 122 – FS.
[97] Section 3.5.2, p. 95.
[98] Section 5.0, p 260.
[99] Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, 40 CFR Part 230 (2008).
[100] Section 5.3, p. 260.
[101] Appendix E, Table 2, p. 10.
[102] Section 2.7.1, Table 7, p. 25.
[103] Appendix E, Section 3.0, p. 7-8.
[104] Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, 40 CFR Part 230 (2008).
[105] Final Independent External Peer Review Report, Science Reports for the Port Everglades Harbor, Florida, Feasibility Study and Environmental Impact Statement (EIS), by Battelle for USACE Ecosystem Restoration Planning Center of Expertise Rock Island Division (August 17, 2011).
[106] Section 404(b)(1) Guidelines.
[107] Section 2.3, p. 22 – FS.
[108] Section 7.2.3, p. 124 – FS.
[109] Section 4.7.2, p.222.
[110] Section 4.7.2, p.221.
[111] Section 2.9.2, p. 48.
[112] Section 2.9.3.2.1, p. 67.
[113] Section 2.9.3, p. 65.

[114] Section 4.0, p. 235.
[115] Section 2.9.3.2.2, p. 67.
[116] http://newspaper-edit.wunderground.com/data/hurricane/mwrscrape/www.aoml.noaa.gov/themes/CoastalRegional/projects/FACE/PtEverg.htm
[117] Section 3.9.1, p. 147 - 148.
[118] *Clostridium perfringens (C. perfringens)* is one of the most common causes of food poisoning in the United States. http://www.foodsafety.gov/poisoning/causes/bacteriaviruses/cperfringens/
[119] For example, Stamates, S J, J R Bishop, T P Carsey, J F Craynock, M L Jankulak, C A Lauter, and M M Shoemaker. Port Everglades flow measurement system. NOAA Technical Report, OAR-AOML-42, 2013, 22 pp.
[120] Futch, J.C., D.W Griffin, K. Banks, and E.K. Lipp. 2011. Evaluation of sewage source and fate on southeast Florida coral reefs. *Marine Pollution Bulletin.* 62: 2308-2316.
[121] Section 4.4.3.2, p. 184.
[122] Section 4.29.5, p. 252.
[123] Section 4.7.1, p. 221.
[124] Section 2.9.4, p. 80.
[125] Section 3.1.
[126] Appendix B.
[127] Section 3.10, p. 151.
[128] Section 3.1
[129] Appendix B.
[130] Appendix B.
[131] Section 1.8.
[132] Section 2.9.4.
[133] Appendix B.
[134] Section 2.9.3.2, p. 67.
[135] *Sea-Level Change Considerations for Civil Works Programs*, EC 1165-2-212 (1 October 2011).
[136] ER1165-2-212.
[137] *Surge Sensitivity Analysis for Sabine Neches Water Way Navigation Project* by Ty V. Wamsley, Mary A. Cialone, and Tate O. McAlpin, March 2010, available at http://ww3.swg.usace.army.mil/pe-p/SNWW/Doc/2Sabine%20Surge%20Final%20Draft%203-22-10.pdf
[138] Section 2.9.3.2.2, p. 67.
[139] Section 4.9.5, p. 228.
[140] Executive Order 12898 entitled *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations.*
[141] Section 6.23, p. 265 – 266.
[142] Protection of Children From Environmental Health Risks and Safety Risks.
[143] Section 2.3.5, p. 37.
[144] Table 31, f.n. 1, p. 117.
[145] Section 2.5.5., p. 40.
[146] Section 2.2.2, Figure 5, p. 20.
[147] Section 2.4, p. 28.
[148] Section 4.5.4.1, p. 194.
[149] Section 4.5.6.2, p. 201.
[150] Section 4.5.9.2, p. 207.
[151] Section 4.9.6, p. 229.
[152] Section 4.9.6, Table 36, p. 230.
[153] Section 4.9.10, p. 234.
[154] Section 4.9.11, p. 234.
[155] Section 3.9.1, p. 147 and Section 3.9.2, p. 148.
[156] Figure 64, p. 150.
[157] P. 182.
[158] Section 7.2.1, p. 123.
[159] Section 7.2.1, p. 123.
[160] Section 3.4, p. 46.

[161] I.e., pp. vii and viii.
[162] Section 7.2, p. 121.
[163] Section 7.2.3, p. 123.
[164] Appendix E, Section 4.1, p-8.
[165] Appendix E, Section 4.4, p. 14.